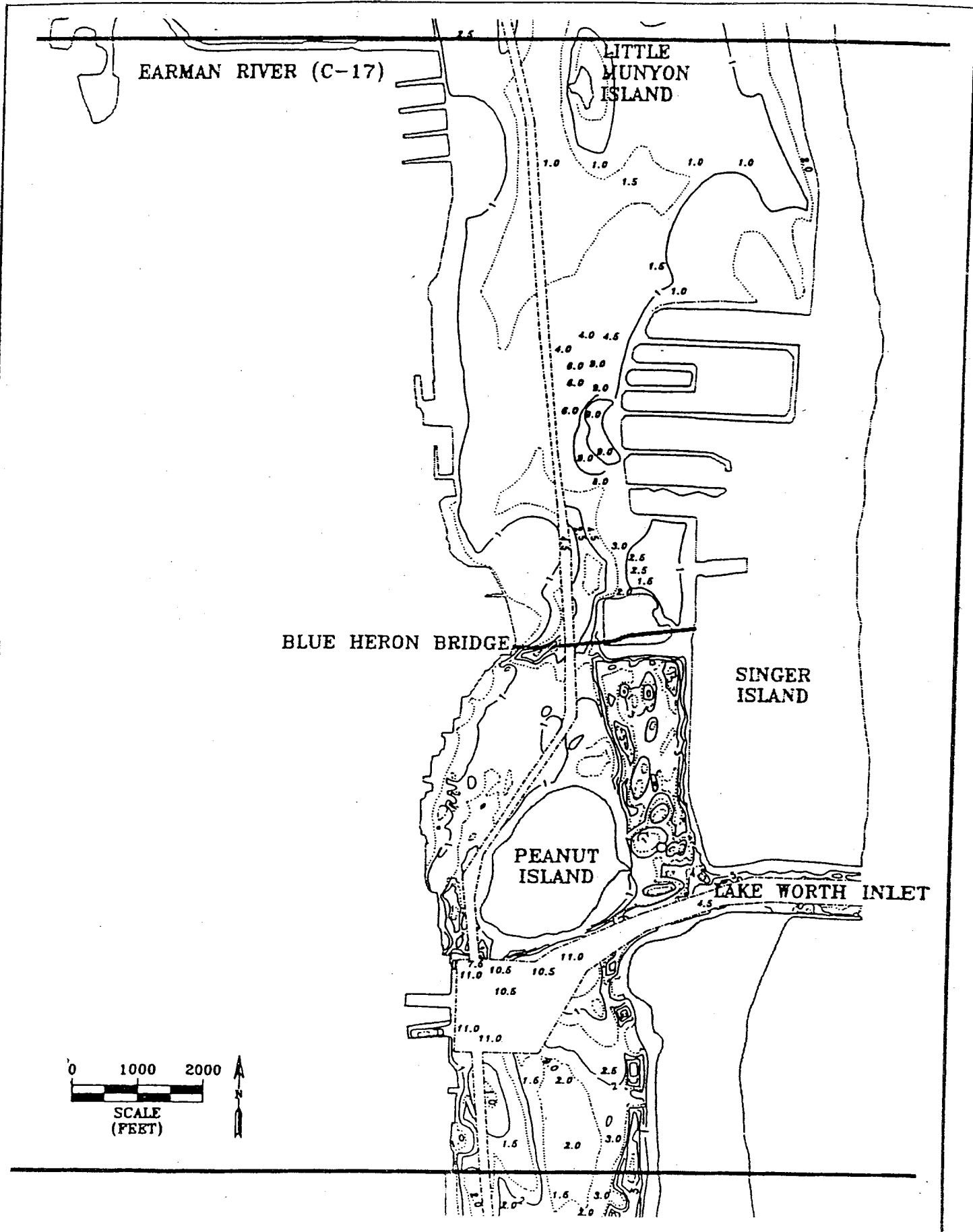


FIGURE 13. PROJECT AREA BATHYMETRY



structure is buried in the side of the hill of dredged material on Peanut Island. Although built in 1961 and removed from use in 1964 following the President's assassination, the Federal Government did not acknowledge the existence and purpose of the shelter until 1973. The bunker is currently being restored and preserved for public viewing through the Palm Beach Maritime Museum.

4.0 ENVIRONMENTAL AFFECTS

This section is the scientific and analytic basis for the comparing of the alternatives. See Table 1 in Section 2.0 Alternatives, for Summary of Impacts. The following includes anticipated changes to the existing environment including direct, indirect and cumulative effects.

4.1 GENERAL ENVIRONMENTAL EFFECTS.

The Port of Palm Beach DMSA would be offloaded down to 4 feet above mean low water (MLW) and 3,200 linear feet of new dike to a height of 32 feet MLW would be constructed within the Port of Palm Beach DMSA boundaries. The dry offloading of the material from the DMSA is planned for offloading from the upland area of the island. Structural equipment needed for the project would be removed at completion of the project. Offloading of the stored dredged material from the Port of Palm Beach DMSA site has little, if any, adverse environmental impacts. These impacts would be temporary and proposes no long-term effect to fish and wildlife species, aesthetics, or public use. The proposed change in maintenance operations from winter hopper dredging to summer pipeline dredging would be within the Palm Beach Harbor existing dredging footprint, increase of navigation depth or side slopes would not occur.

Exotic vegetation is proposed for removal and new dikes constructed would be stabilized with xeric groundcover vegetation. Noise and odor impacts would associated with the planned activity be short term and temporary, most adverse effects would be experienced only during construction, if at all. Sea turtles and manatees should not be adversely affected by the proposed project. Protective measures and best management procedures would be in place to ensure the protected species are not harmed or their critical habitat adversely altered. Disposal of the offloaded material in the anoxic hole adjacent to the identified municipal golf course would be more cost effective and practicable environmental alternative. This option would not require further resource surveys due to extensive resources mapping and sediment analysis performed by and for Palm Beach County DERM (1999). (see Appendix F- Other Studies). The reports were reviewed and accepted during the Corps' environmental assessment of restoration efforts proposed for Peanut Island under Section 1135 or during this evaluation.

4.2 VEGETATION.

4.2.1 PROPOSED ACTION, CHANGE OF DREDGING OPERATIONS AND PALM BEACH HARBOR DISPOSAL SITE OFFLOAD ON PEANUT ISLAND.

The proposed change in winter hopper dredging of the Palm Beach Harbor to summer pipeline dredging would not adversely affect any seagrass within the project area. Dredge pipelines would avoid all known seagrass resources within the project area. The offloading of the Port of Palm Beach DMSA on Peanut Island could result in the removal of some exotic tree species. No impacts to mangroves, seagrass or the environmental restoration project on Peanut Island are anticipated during the proposed summer offloading of the Port of Palm Beach DMSA on Peanut Island.

4.2.2 DREDGED MATERIAL PLACEMENT AT THE LAKE WORTH INLET SOUTH JETTY DISPOSAL AREA.

The disposal site south of the Lake Worth Inlet Channel south jetty has been used in the past to place beach quality material nearshore and help maintain the beach in that area. No vegetation would be adversely affected by the change in maintenance operations and dredged material disposal in this area.

4.2.3 DREDGED MATERIAL PLACEMENT AT THE MIDTOWN BEACH, PALM BEACH.

The disposal site at Midtown Beach, Palm Beach, has been used in the past. Disposal at this site would keep beach quality material on the beach and within the littoral drift process. For the proposed project, a pipeline would be directed southward down the IWW just past the Flagler Memorial Bridge. The pipeline would then head east along the Breakers Golf Course and to the beach. Some ornamental vegetation and or turf could be adversely affected during the proposed project however turf and ornamental vegetation would be replaced. If this disposal option is chosen, the pipeline route would be investigated for mangroves, seagrass and hardbottom prior to project construction. Based on available information, no adverse effect is anticipated to any existing mangroves or seagrass. However, should these resources exist along the planned pipeline route, all attempts would be made to first avoid and then to minimize impacts to these aquatic resources. If impacts are unavoidable, these impacts would be appropriately compensated.

4.2.4 DREDGED MATERIAL PLACEMENT AT THE LAKE WORTH DISPOSAL SITE (LEAST COST ALTERNATIVE).

The disposal site adjacent to the City of Lake Worth Municipal Golf course is a deep anoxic hole of approximately 99 acres, the furthest away from Palm Beach Harbor and Peanut Island. It has not been used before for dredged material disposal. However, approximately 60,000 cubic yards or more of material disposal is proposed over this area from the St. Johns Island environmental restoration and IWW maintenance dredging projects. Engineering studies performed on this site has determined this disposal option has the capacity to receive a million cubic yards of material or more. The disposal of material offloaded from the southern end of Peanut Island would provide over 60 percent of the material needed to raise the elevation and provide a strata at appropriate depths for benthic organisms, marine seagrass, and fishery species. No adverse affects to mangroves or seagrass are anticipated with disposal at this location. Contrary, this disposal option would support restoration efforts that proposes 1.7 acres of fringe mangrove restoration, 11.1 acres of mangrove creation, 2.8 acres of saltmarsh creation, 2.3 acres of oyster reef creation, and 57.1 acres of suitable substrate for benthic recruitment and seagrass proliferation.

4.2.5 NO ACTION ALTERNATIVE (STATUS QUO).

A no action alternative would prevent the eradication of exotic tree species that are out competing indigenous tree species at the Port of Palm Beach DMSA. The uncontrolled growth and proliferation of exotics would eventually affect the restoration efforts proposed at Peanut Island. Such conditions would eventually reduce then eliminate those which provide beneficial detrital input to the aquatic ecosystem, replacing with species with little or no environment or public benefit.

4.3 THREATENED AND ENDANGERED SPECIES.

4.3.1 PROPOSED ACTION, CHANGE OF DREDGING OPERATIONS AT PALM BEACH HARBOR AND DISPOSAL SITE OFFLOADING ON PEANUT ISLAND.

Summer pipeline maintenance dredging activities would replace winter hopper maintenance dredging within the Congressionally authorized limits of Palm Beach Harbor project. The change in dredging method proposes no adverse effect to sea turtles. A sea turtle window (from May to November) would be observed and standard Corps manatee precaution measures would be implemented, in addition to, the Corps' adherence to BMP's. If considered necessary, a sea turtle and manatee observer would be on site during performance of in-water activities. The sea turtle and manatee observer would advise the necessary personnel of sightings with authority to shutdown operations when either species is observed within 50 yards of the project. However, it is anticipated the proposed dredging is not likely to adversely affect the sea turtle or manatee. The manatee is known to frequent the area during the winter months, seeking the warmer waters of the discharge plant located upstream and north of Peanut Island. The proposed change in maintenance operations would eliminate the additional winter manatee conditions that would be necessary to achieve the project's completion.

Dependent upon the disposal option selected, material offloaded from the Port of Palm Beach DMSA would be completed either by pipeline dredge or by dry loading with the material placed on a barge for transport. The disposal options being considered are: 1) a former disposal area south of the Lake Worth Inlet Channel south jetty, 2) a former disposal area at Midtown Beach, Palm Beach, and 3) a never used anoxic hole/former dredged marine borrow site with depth varying from -8 to -23 feet NGVD (National Geodetic Vertical Datum). Disposal options one and two would require pipeline discharge. However, disposal three the preferred and least cost alternative, would require dry offloading and barge transport. Offloading the proposed 600,000 cubic yards of stockpiled material would provide storage capacity for material anticipated from the harbor dredging. The identified threatened and endangered species do occur in the disposal area. However, no adverse impacts should occur to the species or their critical habitat. This is due to the proposed months dredging and construction would occur, the protective measures that would be in place to ensure survival of the species and the initial avoidance of impacts.

4.3.2 DREDGED MATERIAL PLACEMENT AT THE LAKE WORTH INLET SOUTH JETTY DISPOSAL AREA.

Approximately 600,000 cubic yards of dredged material stockpiled at the southern end of Peanut Island at the Port of Palm Beach DMSA would be proposed for disposal south of the Lake Worth Inlet Channel south jetty. This dredged material disposal site has been utilized in the past when suitable beach quality material has been dredged in the area. The material would be placed within the littoral drift and within the existing authorized template/footprint. Use of the material in this manner would provide storm damage reductions and nesting sea turtle habitat. No impacts or adverse affects to threatened and endangered species are anticipated. Sea turtles are known to occur along this portion of the shoreline. The USFWS initially concluded the project "may effect" four listed threatened or endangered species of sea turtles, the loggerhead sea turtle (*Caretta caretta*), the green sea turtle (*Chelonia mydas*), the leatherback sea turtle (*Dermochelys coriacea*), and the hawksbill sea turtle (*Eretmochelys imbricata*). However, the USFWS final determination is that the project is not likely to adversely affect the threatened and endangered sea turtles. (see Appendix C – Pertinent Correspondence, USFWS November 1997). Currently there is no critical habitat designated for the sea turtle. The project proposes no adverse impacts to the continued survival of the species. If this disposal alternative is chosen, an on-site observer would be available during construction to advise and shutdown all work should the species occur within 50 feet of operations.

H. johnsonii has been documented to occur in the immediate area and vicinity of Peanut Island and coordination was initiated with NMFS in accordance with the Endangered Species Act and The Magnuson-Stevens Fishery Conservation and Management Act. Conservation Recommendations were received which the Corps has addressed to some degree with other projects proposed or completed in or adjacent to Lake Worth and Lake Worth Lagoon (i.e., Munyon Island Environmental Restoration, IWW, Palm Beach County maintenance dredging projects, Johns Island Environmental Restoration, or Peanut Island Environmental Restoration). Other conservation recommendations of NMFS that have not been addressed have been reviewed for application where appropriate and consistency with the Corps' navigation and environmental missions. (see Appendix C – Pertinent Correspondence, NMFS May 2002).

4.3.3 DREDGED MATERIAL PLACEMENT AT THE MIDTOWN BEACH, PALM BEACH.

Approximately 600,000 cubic yards of dredged material stockpiled at the Port of Palm Beach DMSA on the south end of Peanut Island would be placed on the beach disposal site south of the Breakers Hotel. This dredged material disposal site has been used in the past when suitable beach quality material has been dredged in the area. This disposal option would keep the dredged material within the littoral drift process and help to provide storm damage reductions. Sea turtles are known to occur along this portion of the shoreline and the USFWS initially concluded the project "may effect" the species listed above. However, the agency later determined the work is not likely to adversely affect the listed species. (see Appendix C – Pertinent Correspondence, USFWS November 1997). Currently there is no critical habitat designated for the sea turtle; and the project proposes no adverse impacts to the continued survival of the species. If this disposal option is chosen, an on-site observer would be available during construction to advise and shutdown all work should the species occur within 50 feet of construction.

4.3.4 DREDGED MATERIAL PLACEMENT AT THE LAKE WORTH DISPOSAL SITE (LEAST COST ALTERNATIVE).

Approximately 600,000 CY of dredged material stockpiled at the Port of Palm Beach DMSA on the south end of Peanut Island would be dry loaded and barged to the Lake Worth Disposal Area. This disposal site located adjacent to the shoreline of the City of Lake Municipal Golf Course and the footprint of the IWW eastern right-of-way. Classified as an anoxic hole and/or marine borrow site of about 99 acres, this area would benefit from the placement of dredged material. It is estimated the site is capable of receiving over one million cubic yards of dredge material. Placement of suitable dredged material in this area would raise benthic elevations and promote seagrass recruitment. Approximately 0.91 acre of *H. johnsonii* (Johnson seagrass), a marine seagrass listed as threatened by the NMFS as of October 14, 1998, occur in several locations near shore. Approximately 0.25 acre of Johnson seagrass resources would be adversely impacted by restoration efforts proposed at this location. These impacts are not associated with this project but are part of the overall environmental restoration efforts to restore 1.7 acre of mangrove fringe, create 11.1 acre of mangrove stand, 2.8 acres of saltmarsh, 2.3 acres of oyster reef, and 57.1 acres of seagrass recruitment substrate. The proposed environmental restoration would offset and compensate resources impacts, exceeding agencies current mitigation requirements. Beyond the identified impacts, no adverse affect to threatened and endangered species is anticipated.

4.3.5 NO ACTION ALTERNATIVE (STATUS QUO).

A no action alternative would preclude disposal of materials stockpiled on Peanut Island. This alternative would dictate the location and purchase of land(s) capable of containing the proposed material with suitable upland area, proposes no impacts to threatened and

endangered species, and offers the necessary clearance from residential areas. A no action alternative would prevent the removal of exotics species and would continue the uncontrolled growth of such vegetation. Such conditions would have adverse environmental impact on indigenous species and the environmental restoration efforts proposed for Peanut Island.

4.4 HARDGROUNDS.

Marine habitats called hardgrounds are known to exist within the project region. Rock outcrops, rock substrate and worm rock are examples of hardgrounds. Impacts to these natural resources are governed by the USFWS. DEP has defined a zone where hardgrounds are likely to be found, as the area landward of the 4-meter depth contour in the Atlantic Ocean or Gulf of Mexico. These geological formations are known to extend from the St Lucie and Martin counties southward (USFWS, 1999).

4.4.1 PROPOSED ACTION, CHANGE OF DREDGING OPERATIONS AT PALM BEACH HARBOR AND DISPOSAL SITE OFFLOADING ON PEANUT ISLAND.

Summer pipeline maintenance dredging activities would replace winter hopper maintenance dredging within the Congressionally authorized limits of the Palm Beach Harbor project. The offloading of dredged material from the Port of Palm Beach DMSA would be completed by pipeline dredge or by dry loading the material onto barges and placing the material in one of three locations: 1) south of the Lake Worth Inlet Channel south jetty, 2) Midtown Beach, Palm Beach, or 3) a 99-acre anoxic hole. The existing berm at the Port of Palm Beach DMSA site at the southern end of the Peanut Island would be excavated down 4 feet above mean low water and 3,200 linear feet of new berm constructed. Summer maintenance dredging of Palm Beach Harbor would also occur with the proposed changes. No aspect of the project proposes any adverse impacts to the environment, public use, fish and wildlife species, or endangered and threatened species. The project would benefit these values with the lowering of the existing berms, removing exotic species, and creating benefits that have long-term environmental functions and values.

4.4.2 DREDGED MATERIAL PLACEMENT AT THE LAKE WORTH INLET SOUTH JETTY DISPOSAL AREA.

Approximately 600,000 CY of dredged material stockpiled at the Port of Palm Beach DMSA, on the south end of Peanut Island, would be placed in the dredged material disposal site south of the Lake Worth Inlet Channel south jetty. The dredged material disposal site has been utilized in the past when suitable beach quality material has been dredged in the area. This disposal option would keep the dredged material within the littoral drift process and help to provide storm damage reductions. Hardgrounds impacts would have to be addressed with this disposal alternative. There are at two known locations within the immediate project vicinity, within the entrance channel of Lake Worth Inlet. Potential adverse impacts to these resources could occur from the disposal, if disposal material drifted from the existing template. The occurrence of this action occurring is small, given the monitoring requirement dictated by the Corps (plans and specs.) and the requirements of the project to meet and maintain the State's water quality standards. However, should this disposal alternative be recommended, resource surveys would be conducted prior to construction/disposal activities to ensure the submerged resources are identified, marked, and protected from coverage.

4.4.3 DREDGED MATERIAL PLACEMENT AT THE MIDTOWN BEACH, PALM BEACH.

This dredged material disposal site has been used in the past when suitable beach quality material has been dredged in the area. This disposal option would keep the dredged material within the littoral drift process and help to provide storm damage reductions. Should this

disposal alternative be recommended, resource surveys would be conducted prior to construction/disposal activities to ensure any existing resources are identified, marked and protected from coverage. It is not anticipated that any submerged resources would be adversely impacted. Material disposal would be maintained within the authorized template.

4.4.4 DREDGED MATERIAL PLACEMENT AT THE LAKE WORTH DISPOSAL SITE (LEAST COST ALTERNATIVE).

The Lake Worth Disposal Area is located adjacent to the shoreline of the City of Lake Municipal Golf Course and the footprint of the IWW right-of-way just south of Canal 51 (C-51, in Lake Worth Lagoon). The anoxic hole would benefit from the placement of dredged material. The benthic elevations in the area would be raised to promote recruitment of seagrasses. The dredged material would be dry loaded and barged to the disposal site adjacent to the IWW channel. The dredged material would be dumped in the disposal site while the barge is anchored over the anoxic hole. There are no known hardgrounds covers in this area. No impacts or adverse affects to hardgrounds are anticipated from this disposal alternative.

4.4.5 NO ACTION ALTERNATIVE (STATUS QUO).

A no action alternative proposes potential adverse impacts to submerged resources. This alternative would also prevent the use of Peanut Island as a dredged material storage site during the maintenance dredging of Palm Beach Harbor. In addition to, continuing the proliferation of exotics presently growing on the island.

4.5 FISH AND WILDLIFE RESOURCES.

4.5.1 PROPOSED ACTION, CHANGE OF DREDGING OPERATIONS AND PALM BEACH HARBOR DISPOSAL SITE OFFLOAD OF PEANUT ISLAND.

The proposed change in maintenance operation from winter hopper dredging to summer pipeline dredging of the Palm Beach Harbor would need to be completed prior to the USFWS sea turtle window that extends from May 1 until November. An endangered species observer would help to prevent sea turtle and manatee incidents during project construction. West Indian manatees are also known to frequent the proposed project area and have been seen congregating around the power plant during colder temperatures. Standard Corps manatee precaution measures would need to be implemented for this aspect of the proposed project. Migratory birds are not anticipated to be a project concern.

4.5.2 DREDGED MATERIAL PLACEMENT AT THE LAKE WORTH INLET SOUTH JETTY DISPOSAL AREA.

This dredged material disposal alternative would need to observe the USFWS sea turtle window and requires an endangered species observer on the vessel at all times. Manatee precautions would need to be implemented to ensure adverse impacts to manatees did not occur. There should be no adverse impacts to seagrass from this alternative. Material disposal would be within an existing template/footprint. No expansion of the existing authorization is proposed or necessary. If considered necessary, a seagrass survey would be undertaken and completed prior to any disposal activities. This action would ensure any existing resources are identified, marked and protected. No adverse impacts to migratory birds are anticipated.

4.5.3 DREDGED MATERIAL PLACEMENT AT MIDTOWN BEACH, PALM BEACH.

This dredged material disposal alternative would also need to be undertaken outside of the USFWS sea turtle window. Vessels would need to have an endangered species observer onboard as recommended by the Corps standard manatee precaution measures. Migratory birds are not anticipated to be a concern of the project. No adverse impacts are anticipated to seagrass resources. Material placement would be within an existing disposal footprint. No

expansion of the existing footprint is proposed or necessary. If considered necessary a seagrass survey would be completed prior to any disposal activities. This action would ensure that any existing resources are identified, marked, and protected. Standard Corps manatee precautions would need to be implemented to ensure adverse impacts to manatees did not occur.

4.5.4 DREDGED MATERIAL PLACEMENT AT THE LAKE WORTH DISPOSAL SITE (LEAST COST ALTERNATIVE).

This site is primarily a large anoxic hole/depressional tidal area with mud bottom marine habitat. Containing approximately 99 acres with depth varying from -8 to -23 feet NGVD, the site is capable of receiving 1,000,000 CY or more of dredged material. This disposal alternative would need to be undertaken outside of the USFWS sea turtle window. Vessels would need an endangered species observer as recommended by the Corps standard manatee precaution measures. The disposal of material at this location would raise the benthic grade to between the +1-foot to -5-foot elevation NGVD. Palm Beach County Department of Environmental Resources Management (DERM), conducted sea grasses surveys of the disposal area, October 8, 1998, and September 14 and 15, 2000. (see Appendix C, Pertinent Correspondence, Palm Beach DERM October 2001). The reports document a total seagrass cover of 1.29 acres in the shallow water areas near the shore between elevations -1.5 feet and -3.5 feet NGVD. The endangered species *H. johnsonii* (Johnson seagrass) occupy about 0.92 acre of the total seagrass cover, occurring in a narrow discontinuous band along the western edge of the Lake Worth Lagoon shoreline.

Joint environmental restoration proposed at this location by Palm Beach County, FIND, the City of Lake Worth, and the Corps would impact about 0.25 acre of the endangered Johnson seagrass. The project, however, has the potential to provide approximately 57 acres of seagrass. It is anticipated Johnson seagrass would be a recruitment species. The project further proposes restoration to 1.7 acres of mangrove fringe, 2.8 acres of saltmarsh creation, 2.3 acres of oyster reef, and 11.1 acres of mangrove creation. About 40 percent of the material needed to raise the elevations at this site would come from the offloading of material from Johns Island and the northern end of Peanut Island. If this disposal option is chosen for disposal of material from the southern end of Peanut Island, approximately 60 percent of the needed material could be obtained.

Migratory birds are not anticipated to be a concern of the proposed action.

4.5.5 NO ACTION ALTERNATIVE (STATUS QUO).

The no action alternative would limit the scope of environmental restoration efforts proposed at this location. A no action alternative would preclude the Corps from the use of mitigation measures that could be available to support future navigation missions in this area.

4.6 HISTORIC PROPERTIES.

Two historic structures exist on Peanut Island, a former U.S. Coast Guard Station that was placed in service in 1937 and the bunker used to protect President Kennedy during the Cuban Missile Crisis in 1962. Both structures are eligible for inclusion in the National Register of Historic Places but are not listed at this time. The change in operations maintenance project and offloading of dredged material from the Port of Palm Beach DMSA would be preformed adjacent to both historic sites. Existing dike elevations will be lowered and grassed when construction has been completed. The Corps' archeologist has coordinated the proposed work with the Florida State Historic Preservation Officer (SHPO). No adverse impacts are anticipated to these resources.

No historical resources are known to exist at the proposed disposal sites. It is the SHPO opinion the work proposed adjacent LWMGC would not impact any sites eligible for listing in the *National Register of Historic Places*. A no effect determination has been received. (see Appendix C - Pertinent Correspondence, Fla. DHR Letter, Sept 2000). The Corps is coordinating this determination with SHPO.

4.7 SOCIO-ECONOMIC.

The use of the Palm Beach Harbor DMSA is considered a convenient and cost effective method for temporary and long-term storage of dredged material obtained from maintenance of Palm Beach Harbor. Other alternative disposal sites or ocean disposal sites are generally cost prohibitive, either being located further away, or present difficulty in achieving the standards required at DMSA sites, or propose impacts to aquatic and environmental resources.

4.8 NAVIGATION.

Maintenance of Palm Beach Harbor is an annual event with the minimum amount of material dredged 25000 CY. (see Appendix D – Engineering Information, Letter Report). Offloading stockpiled dredged material from Peanut Island would provide the necessary disposal capacity within proximity of dredging activities. No adverse affects to navigation within the project area are expected. Maintenance of the Harbor would continue the Corps' mission to provide free and unobstructed navigation of the nation's waters. Disposal of the dredged material is an essential component to the Corps' mission. Beach disposal is an alternative, but usually not the most cost effective alternative and includes inherent environmental consequences to area threatened or endangered species. Ocean disposal is not an available alternative for this project, being cost prohibited, and requires approval by the U.S. Environmental Protection Agency (EPA), and is usually reserved for sediments with high levels of contaminants and pollutants. The disposal alternative that allows maximum offloading of material, is cost effect, and provides environmental benefits. The recommended and preferred alternative is located adjacent to the City of Lake Worth Municipal Golf Course.

4.9 AESTHETICS.

The proposed project is a change of maintenance operations from winter hopper dredging to summer pipeline dredging for Palm Beach Harbor and the offload of dredged material from the Port of Palm Beach DMSA at the southern end on Peanut Island. Area aesthetics would be improved with lowering of the DMSA berm to -32 feet above mean low water. This value receives benefits also with the proposed removal of exotic plant species. No adverse impacts to the area's aesthetic values are anticipated.

4.10 RECREATION.

Palm Beach County in partnership with FIND proposes to create amenities that support a public use park. This area would be located on 50 acres at the north end of Peanut Island and would be in addition to the proposed \$5.9 million environmental restoration of Peanut Island. Some temporary disruption to the public's recreation pursuits would be expected during construction. These impacts would be temporary and propose no long-term adverse impacts.

4.11 COASTAL BARRIER RESOURCES.

The proposed change in maintenance operations and related activities are adjacent to or within a designated Coastal Barrier Resource Unit. A review of the USFWS Coastal Barrier Resource Maps locates the nearest Coastal Barrier Resource Unit two miles north of the proposed project area (FL-18P – John D. MacArthur Beach State Recreation Area). No adverse impacts are anticipated to this resource.

4.12 WATER QUALITY.

The proposed project would comply with all Federal and State water quality requirements. All directives in the issued environmental permits would be followed to ensure any generated turbidity is monitored and contained as required. Water quality data has been collected in Lake Worth Lagoon since the late 1960's. The data indicates that the lagoon is a moderately polluted estuarine system. A trend analysis indicates water quality remained either fairly constant or improved slightly over a fifteen-year period. Analysis of sediments for heavy metals and organic compounds indicate a system that chronically receives runoff from urban development (Dames and Moore, 1999). A source of this runoff would be diverted with improvement proposed to the Canal Number 51 (south of the City of Lake Worth disposal option) which releases a large volume of freshwater in to the Lake Worth estuary. Adverse affects from project-generated turbidity are not anticipated. The disposal alternatives have been selected to minimize impacts to water quality.

4.13 SOLID WASTE.

The Corps would not expect solid waste management issues to be a concern with the proposed change in maintenance operations project proposed at the Port of Palm Beach Harbor or Peanut Island. A change in the Port of Palm Beach maintenance dredging from winter hopper to summer pipeline dredging may involve some dredged material that is not suitable for beach disposal. This material would be disposal of in a suitable and approved location. Offloading the Port of Palm Beach DMSA into the least cost alternative disposal area should not present any solid waste management issues either. The disposal of the offloaded dredged material to other disposal alternatives could involve other management issues. The issues would be addressed/resolved when and if they materialize.

4.14 HAZARDOUS, TOXIC AND RADIOACTIVE WASTE.

Palm Beach County completed a Phase I Environmental Site Assessment for Peanut Island, in November 1997, Environmental Resources Management report. The results of their investigation showed there were no hazardous, toxic and radioactive wastes (HTRW) on the island. The preliminary HTRW investigation was completed in June 2000 as per ER1165-2-123, HTRW Guidance For Civil Works Projects and showed in general, no evidence of HTRW. No HTRW management issues are anticipated with the Peanut Island offload, disposal, or maintenance dredging of the Palm Beach Harbor. Remediation of the site would occur, should contaminants be encountered during the project's construction.

4.15 AIR QUALITY.

Construction activities would produce some minor and temporary impacts (dust and exhaust) to air quality within the project area. Once construction activities are completed, these impacts should dissipate and air quality should return to pre-construction levels. Minor impacts to air quality would be expected from the other project disposal alternatives also. These potential, minor, temporary air quality impacts would return to pre-construction conditions once the project has been completed.

4.16 NOISE.

The potential for some increase in noise to the surrounding project area is anticipated but to the degree or extent would depend on the proximity of the surrounding areas. Adverse affects generated by construction noise are not anticipated to be substantial or even noticeable. The distance of residential development from the proposed project location and the existing vegetative buffers will dissipate construction noise of any significance before it becomes problematic.

4.17 PUBLIC SAFETY.

No adverse impacts are anticipated to public safety issues associated with the proposed action or dredged material disposal alternatives.

4.18 ENERGY REQUIREMENTS AND CONSERVATION.

Use of the Port of Palm Beach DMSA on Peanut Island would be as or more energy efficient than use of the other disposal alternatives discussed in this EA for the summer pipeline maintenance dredging of Port of Palm Beach. Beach, ocean and most other disposal options are further away, would require more energy and generally cost more to complete. The least cost alternative to offload and dispose of dredged material from the Port of Palm Beach DMSA is the anoxic hole adjacent to the City of Lake Worth Municipal Golf Course. This alternative would be as or more energy efficient than other disposal alternatives discussed in this EA.

4.19 NATURAL OR DEPLETABLE RESOURCES.

The change in maintenance operations at the Port of Palm Beach and Peanut Island would adversely affect natural or depletable resources. Placement of the dredged material stored at the Port of Palm Beach DMSA on Peanut Island into the anoxic hole adjacent to the City of Lake Worth Municipal Golf Course would provide benthic elevations in the disposal area that could recruit seagrass and provide aquatic habitat value in the future. Beach placement would also make practical use of the dredged material and provide habitat area for nesting sea turtles. Ocean disposal would largely make the sand inaccessible.

4.20 SCIENTIFIC RESOURCES.

No notable impacts on any scientific resources by the proposed action of least cost alternative are anticipated.

4.21 NATIVE AMERICANS.

The likelihood is small of any Native American artifacts or resources existing on Peanut Island. Peanut Island was constructed in 1918 from dredged material disposal. The same status would apply to the harbor and disposal sites. Past impacts from dredging activities would have adversely impacted any resources that may have existed. Research undertaken prior to any federally project would have ensured that no adverse impacts resulted to any resources existing. We do not expect any impacts on Native Americans resources by the proposed action or disposal alternatives.

4.22 CUMULATIVE IMPACTS.

Cumulative impacts are those impacts on the environment that results from the incremental impact of an action when added to other past, present and reasonably foreseeable future actions (40 CFR 1508.7). The proposed action would occur within the existing Port of Palm Beach footprint for the Harbor. Only a change in dredging method and timing of the proposed work and related activities are proposed. Namely, winter hopper dredging would be replaced with summer pipeline dredging with dry loading of material from the southern end of the island. Disposal of the offloaded material at the preferred alternative (least cost disposal alternative) would provide beneficial benthic elevations for seagrass recruitment and other benthic organisms in the Lake Worth Lagoon near the C-51 outfall. This disposal option is expected to produce minimal adverse cumulative impacts as compared to other proposed alternatives (other than the no action). Marine seagrass in Lake Worth and Lake Worth Lagoon would experience over 20 acres of adverse impacts from navigation and other project proposed in this area. The

principal impacts would result from channel maintenance and dredging of basins and slips where seagrass species have become established. Success of the mitigation proposed adjacent to the municipal golf course would offset the proposed impacts. Seagrass recruitment may have a higher success ratio upon completion of the C-51 project that would eventually remove a large source of freshwater input from the Lake Worth Lagoon estuary. Mitigation credit would be sought for benefits to seagrass, mangrove, and other habitats associated with the filling of the dredge hole. The mitigation credit would be used to offset impacts from future dredging projects.

4.23 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES.

4.23.1 IRREVERSIBLE.

An irreversible commitment of resources is one in which the ability to use and/or enjoy the resource is lost forever. The Corps do not anticipate any irreversible commitment of resources for the proposed action (other than fuel and materials for construction). The use of some other disposal alternatives (besides the least cost alternative) may result in a loss of the dredged material resource to the littoral drift process of the Atlantic Ocean coast.

4.23.2 IRRETRIEVABLE.

An irretreivable commitment of resources is one in which due to decisions to manage the resource for another purpose, opportunities to use or enjoy the resources as they presently exist are lost for a period of time. An example of an irretreivable loss might be where a type of vegetation is lost due to road construction. We do not expect any notable irreversible commitment of resources for the proposed action. Some loss of exotic vegetation within the Port of Palm Beach DMSA may occur during construction. This loss is anticipated and would be promoted with construction of the project. The construction of the least cost dredged disposal alternative would provide suitable benthic elevations to restore some habitat value in the area of the City of Lake Worth Municipal Golf Course shoreline.

4.24 UNAVOIDABLE ADVERSE ENVIRONMENTAL EFFECTS.

Unavoidable adverse environmental impacts generated from the proposed action would be relatively minor. Impacts from various alternatives may be greater (see impacts discussed in the above sections).

4.25 LOCAL SHORT-TERM USES AND MAINTENANCE/ENHANCEMENT OF LONG-TERM PRODUCTIVITY.

The proposed action would increase the storage capacity of the Port of Palm Beach DMSA on the southern end of Peanut Island. Since the dredged material would be offloaded from the site and used for an environmental habitat restoration project (least cost disposal alternative), there would be no anticipated adverse affects to local short-term uses of the Peanut Island site. The long-term use of the Peanut Island disposal site would also be established for future summer pipeline maintenance dredging operations of the Port of Palm Beach. Disposal options other than the Least Cost Alternative would most likely cost more and require long-term considerations to be more extensively studied.

4.26 INDIRECT EFFECTS.

The change of maintenance operations at the Port of Palm Beach and the offloading of the Port of Palm Beach DMSA would contribute to the economical maintenance and possible future prosperity of Palm Beach Harbor.

4.27 COMPATIBILITY WITH FEDERAL, STATE AND LOCAL OBJECTIVES.

Since Port of Palm Beach and the associated DMSA are established facilities, it should not be contrary to Federal, State or local objectives and land use planning.

4.28 CONTROVERSY.

The only potential controversies with the proposed Federal project would be the extent and degree of adverse affects to the historic resources on Peanut Island adjacent to the Port of Palm Beach DMSA and the degree of adverse impacts to existing seagrass within the project area. Some potential controversy regarding essential fish habitat (seagrass) could also be expressed. All necessary coordination has been initiated to ensure any and all controversy to the project have been addressed or resolved.

4.29 UNCERTAIN, UNIQUE, OR UNKNOWN RISKS.

No uncertain, unique or unknown risks have been identified nor are they anticipated with the construction of the proposed Federal project.

4.30 PRECEDENT AND PRINCIPLE FOR FUTURE ACTIONS.

The change in maintenance operations from winter hopper dredging to summer pipeline dredging is not anticipated to set a precedence or principle for future actions. The dry offloading of the Port of Palm Beach DMSA and rehabilitation of the existing dikes is not anticipated to set precedent or principle for future actions.

4.31 ENVIRONMENTAL COMMITMENTS.

The U.S. Army Corps of Engineers and contractors commit to avoiding, minimizing, or mitigating adverse effects during the project construction activities. These commitments are written into the contract's specifications as following: (1) All water-based activities shall follow Jacksonville District US Army Corps of Engineers Standard Manatee Protection Conditions; (2) USFWS turtle window requirements, conditions and recommendations shall be followed; (3) The Jacksonville District, US Army Corps of Engineers, Migratory Bird Protection Policy would be followed if any migratory birds are encountered, (4) All water turbidity requirements listed in the State of Florida's water quality certificate permit would be implemented, (5) Invasive species management shall be undertaken to reduce species where possible and prevent their distribution in all instances, (6) All seagrass impacts shall be avoided where possible, minimized or mitigated as appropriate under the direction of the National Marine Fisheries Service, (7) Prior to construction, the State must concur with the Coastal Zone Consistency Statement (Appendix B), (8) Dike rehabilitation work would occur within the existing dike footprint, (9) Prior to construction, the State Historic Preservation Officer must concur with the Jacksonville District's determination of no effect on any eligible historic resources.

4.32 COMPLIANCE WITH ENVIRONMENTAL REQUIREMENTS.

4.32.1 NATIONAL ENVIRONMENTAL POLICY ACT of 1969, as amended.

Environmental information on the project has been compiled and this Environmental Assessment and Finding of No Significant Impact have been prepared and will be circulated prior to the commencement of the project in accordance with requirements of the National Environmental Policy Act (NEPA), as amended. A public notice would follow the EA.

4.32.2 ENDANGERED SPECIES ACT of 1973, as amended.

A list of endangered, threatened, proposed, or candidate species that may inhabit the project area was received from both the U.S. Fish and Wildlife Service (USFWS) and the National Marine Fisheries Service (NMFS). This project has been fully coordinated under the Endangered Species Act; and therefore, would be in full compliance with the Act.

4.32.3 FISH AND WILDLIFE COORDINATION ACT of 1958, as amended.

In response to the requirements of this Act, the District has and would continue to maintain coordination with the USFWS during all stages of the planning and construction process. The USFWS (October 3, 1994 letter) had no objection to the restoration project as long as Corps' standard manatee protection guidelines were followed and maintained during the project construction (see APPENDIX C –Pertinent Correspondence USFWS 2002).

4.32.4 NATIONAL HISTORIC PRESERVATION ACT of 1966, as amended.

Based on research conducted by the Corps' archeologist, significant historic properties are not likely to be located within the proposed change of maintenance project area. Historic properties eligible for inclusion in the National Register of Historic Places are located adjacent to the project area but would not be affected. The no adverse effect was made, and consultation with the SHPO was conducted for the Section 1135 Environmental Restoration Project, according to the guidelines established in 36 CFR Part 800 and in compliance with Section 106 of the National Historic Preservation Act, as amended. The SHPO no effect determination has been received for the work proposed on Peanut Island and the recommended disposal alternative.

4.32.5 CLEAN WATER ACT of 1972, as amended.

This project is in full compliance with the existing water quality requirements. Water quality certification (Section 401) is not required for the offloading of dredged material from Peanut Island. Other aspects of the project have received water quality certification under the Section 1135, Peanut Island Environmental Restoration proposal or under the permits authorizing maintenance dredging of Palm Beach Harbor. Water quality certification has also been received for disposal proposed at the dredged hole adjacent to the LWMGC. (see Appendix E – Other Actions on Peanut Island).

4.32.6 CLEAN AIR ACT of 1972, as amended.

No permits would be required for this project. This project is in full compliance with the Act. This Environmental Assessment would be forwarded to EPA's Environmental Policy Section for their review. The EPA did no object to the project or the preparation of an environmental assessment instead of a more comprehensive environmental statement format.

4.32.7 COASTAL ZONE MANAGEMENT ACT of 1972, as amended.

This project is in compliance with this act. See Appendix B for the Coastal Zone Consistency Statement.

4.32.8 FARMLAND PROTECTION POLICY ACT of 1981.

This act is not applicable to the proposed environmental restoration project.

4.32.9 WILD AND SCENIC RIVER ACT of 1968, as amended.

This act is not applicable to the proposed change of maintenance operations project.

4.32.10 MARINE MAMMAL PROTECTION ACT of 1972, as amended.

The customary safeguards to ensure protection of threatened and endangered species such as sea turtles and manatees will be implemented within the construction contract.

4.32.11 ESTUARY PROTECTION ACT of 1968.

No designated estuary would be affected by the proposed change of maintenance operations project activities. This Act is not applicable.

4.32.12 E.O. 11999, PROTECTION OF WETLANDS.

Wetlands would not be adversely affected by the proposed change in maintenance operations project but could be enhanced by the least cost disposal alternative, therefore, this project is in compliance with the Executive Order.

4.32.13 E.O. 11988, FLOODPLAIN MANAGEMENT.

No activities associated with this project adversely impact a floodplain.

4.32.14 E.O. 12898, ENVIRONMENTAL JUSTICE.

No adverse impacts to human health or the environment are anticipated as result of the proposed project. Impacts to "subsistence consumption of fish and wildlife resources" are not anticipated as a result of the proposed project.

4.32.15 E.O. 13089, CORAL REEF PROTECTION.

Those species, habitats, and other natural resources associated with coral reefs would not be adversely affected by the proposed project.

4.32.16 E.O. 13112, INVASIVE SPECIES.

The proposed change of maintenance operations project at Port of Palm Beach and Peanut Island would include the rehabilitation of some of the dike areas. This would provide an opportunity to remove some of the existing exotic tree species (Casuarina spp, Australian Pine) currently growing within the Port of Palm Beach DMSA site. The Federal project is not authorizing, funding, or carrying out actions that might spread or introduce invasive species. All feasible and prudent measures to minimize risk of introducing invasive species would be followed. The contractor, however, would be required to obtain the necessary State permit in accordance with Chapters 62C-20 or 62C-54, F.A.C, as required for the transporting and disposal of prohibited or noxious aquatic plants. Australian Pine is listed by the State of Florida as a Class I Prohibited Aquatic Plants. The Corps initiated research of the State's Invasive Species Management Plan to determine the recommended remove of the existing exotic species. The State recommended method of removal would be required of the contractor and included in the project's plans and specifications. Herbicidal agents that may be applied to eradicate the existing invasive exotic species would be appropriately used with all cuttings transported and disposed of in an approved location.

4.32.17 FEDERAL WATER PROJECT RECREATION ACT.

The principles of the Federal Water Project Recreation Act, (Public Law 89-72) as amended, are not applicable to the proposed change in maintenance operations project as no recreation component is proposed.

4.32.18 FISHERY CONSERVATION AND MANAGEMENT ACT of 1976.

The project has been coordinated with the National Marine Fisheries Service (NMFS) with conservation recommendations (CR) received for the project. The Corps implementation of the CRs would be accomplish when and where practicable.

4.32.19 SUBMERGED LANDS ACT of 1953.

The proposed change of maintenance operations project would not affect submerged State lands. The disposal of the excavated material from Port of Palm Beach DMSA into an anoxic hole adjacent to the Lake Worth Golf Course shoreline would improve benthic resources within that area. The local sponsor would acquire the necessary real estate easements for this work. The Corps would apply for water quality certificate to undertake the work.